openSUSE Kubic

The Container Platform by openSUSE

https://kubic.opensuse.org

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Agenda

- About me
- The openSUSE project
- openSUSE Kubic
- Features
- Transactional Updates
- openSUSE Leap and Kubic
- Podman
- How to contribute

About me

- Student in Computer Science (B.Sc.), TH Nürnberg
- Student Representative in Senate/ University Council
- Student Representative in AG Study Plan, AG Laboratories
- Founder AG Open Source (Educator + Trainer), TH Nürnberg
- Global Translation Coordinator, QA, Wiki, Advocate (openSUSE) at openSUSE
- Chairman at One Week Experience e.V. (One Week Student)

open build service

openSUSE medical

OSEM

openQA

openSUSE®

Kubic

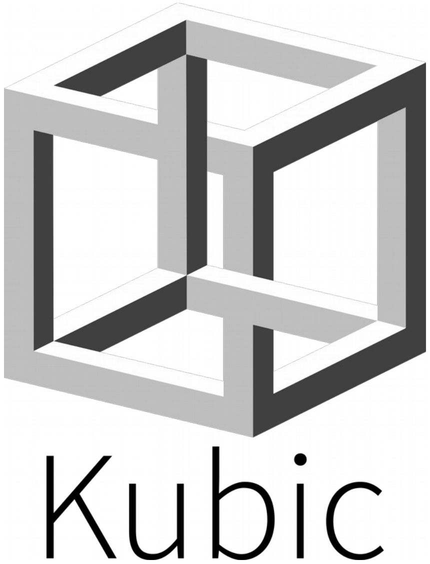
Tumbleweed

FACTORY TESTED

Leap

openSUSE Kubic project

- Container as a Service Platform
- MicroOS, based on openSUSE Tumbleweed
- Provides all to run a Kubernetes cluster



Features

- Transactional Updates
- Fully automated updates possible
- Latest packages with openSUSE Tumbleweed
- Based on Podman
- Easy to use for people with other container knowledge (e.g Docker)

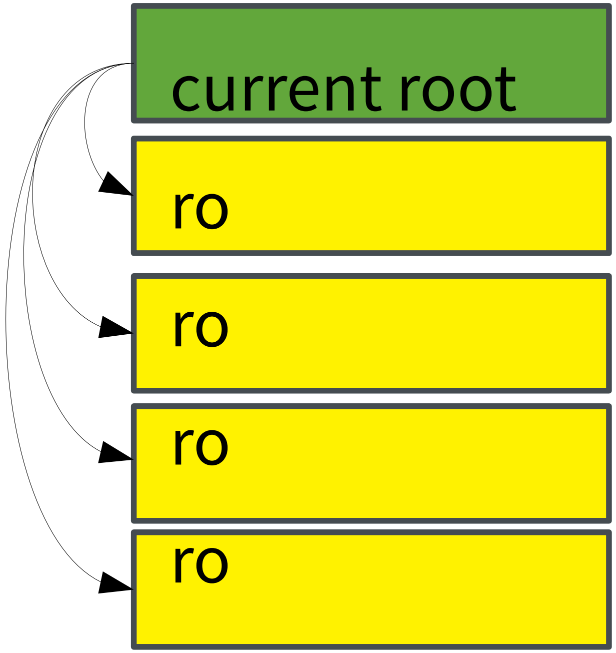
Transactional Updates

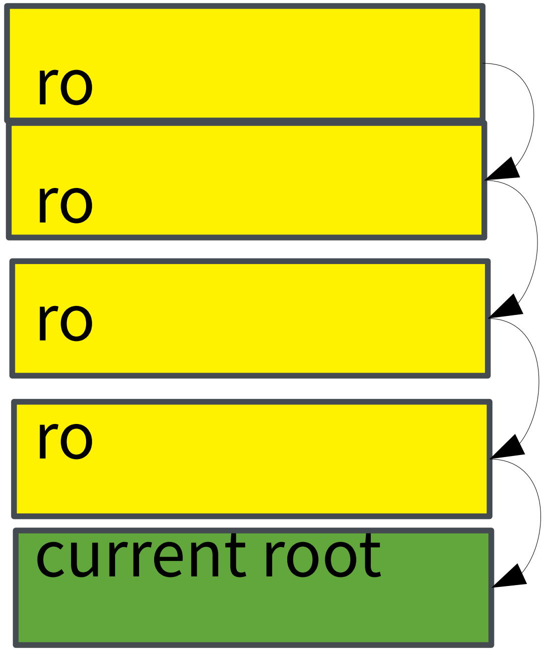
- Is Atomic:
  - Fully applied or not at all
  - Update does not influence the running system
- Can be rolled back:
  - A failed or incompatible update can be discarded and the previous system can be restored

Requirements

- BtrFS root filesystem with snapper (snapshots)/ rollback enabled
- zypper
- btrfsprogs

Snapshots vs. Transactional Updates





Transactional Update

- Clone of current root to ro
- Change rw
- zypper up

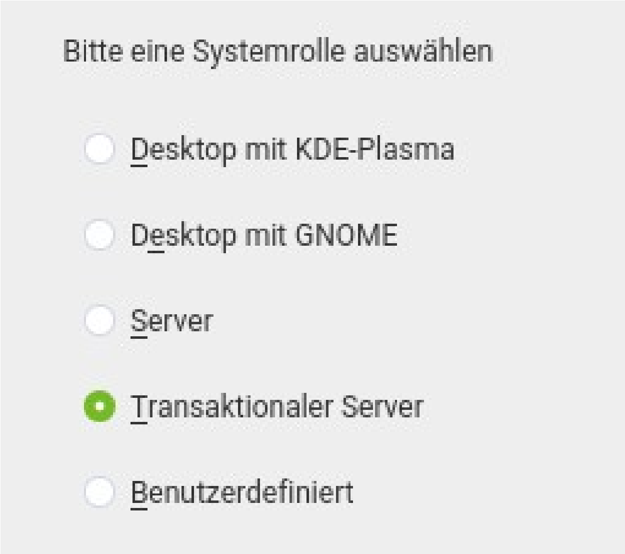
- Change to ro
- “Rollforward” with btrfs subvol set-default
- After reboot change / update executed
- Quickly rollback

Executing Transactional Updates

- Update/Upgrade: transactional-update [up|dup|patch]
- Installation/ Remove / Update 1 package:

  transactional-update pkg [install|remove|update] pkg
- Rollback:

  transactional-update rollback



Bitte eine Systemrolle auswählen

○ Desktop mit KDE-Plasma

○ Desktop mit GNOME

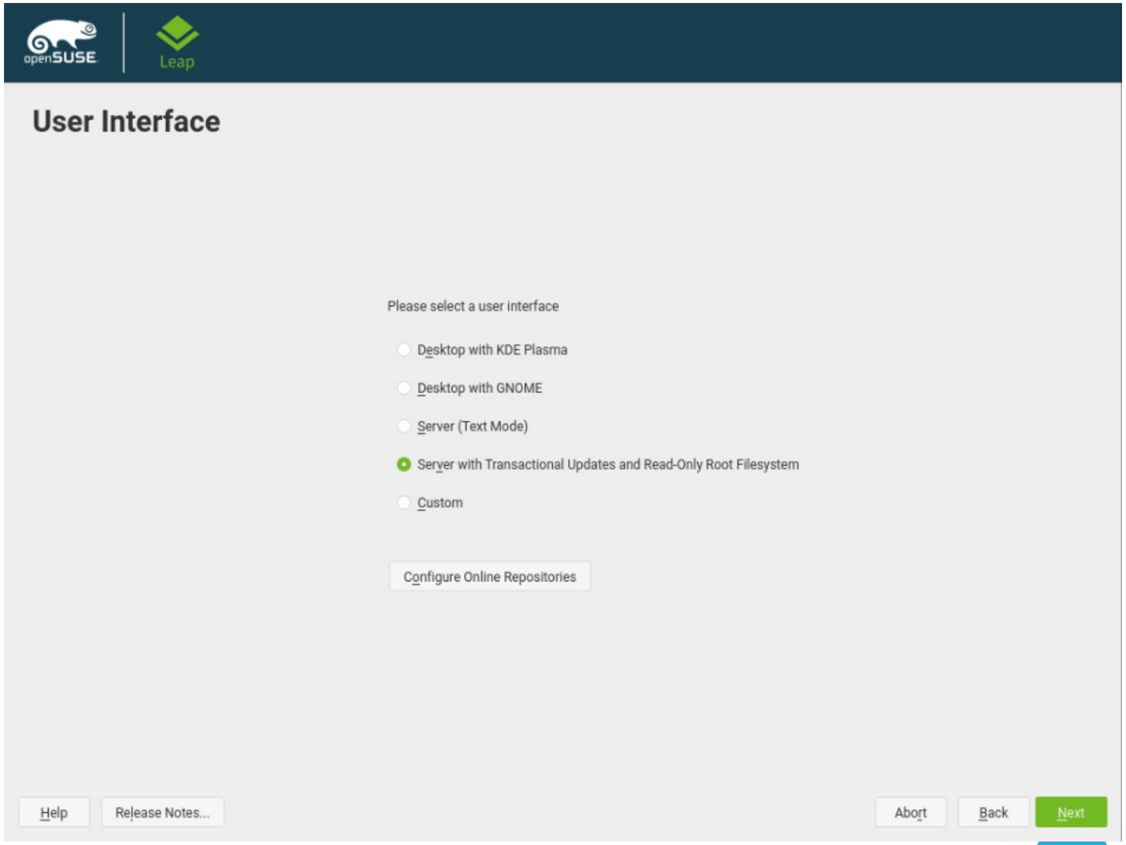
○ Server

● Transaktionaler Server

○ Benutzerdefiniert

How does Leap profit from Kubic?

- Transactional Updates available in Tumbleweed and Leap



User Interface

Please select a user interface

○ Desktop with KDE Plasma

○ Desktop with GNOME

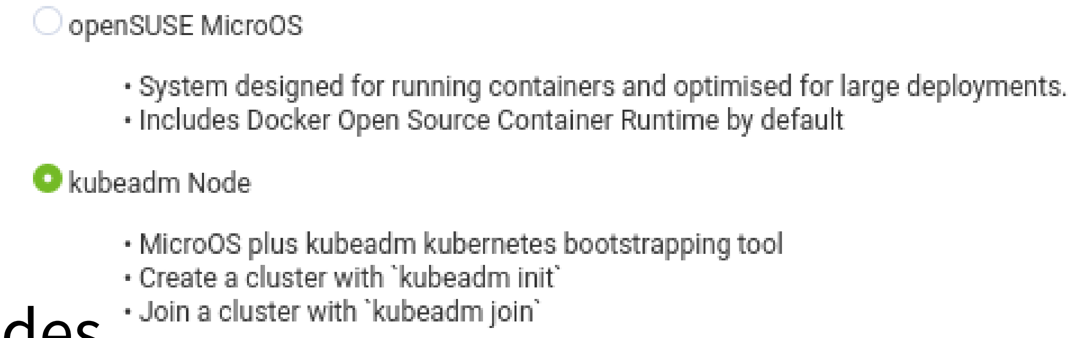
○ Server (Text Mode)

● Server with Transactional Updates and Read-Only Root Filesystem

○ Custom

kubeadm

- toolkit produced by Kubernetes
- Creation of kubeadm nodes for a cluster
- Initialization of the network and joining a node:
- *kubeadm init –pod-network-cidr=10.244.0.0/16*
- *kubeadm join*



○ openSUSE MicroOS

- System designed for running containers and optimised for large deployments.
- Includes Docker Open Source Container Runtime by default

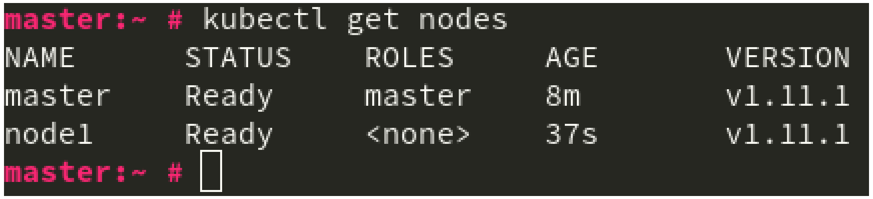
● kubeadm Node

- MicroOS plus kubeadm kubernetes bootstrapping tool
- Create a cluster with `kubeadm init`
- Join a cluster with `kubeadm join`

kubicctl

- Adding Worker Nodes:
  - *kubicctl node add node1,node2,…*
- Verifying the cluster:
  - *kubectl get nodes*

Verification of the cluster



```
master:~ # kubectl get nodes
NAME      STATUS    ROLES     AGE       VERSION
master    Ready     master    8m        v1.11.1
node1     Ready     <none>    37s       v1.11.1
master:~ #
```

Kubic Node Roles

- Kubic Admin Node:
  - kubicd

    (daemon which communicates via gRPC with clients and setup of Kubernetes network)
  - salt-master (for node management via Dashboard)
  - Kubernetes Master Node

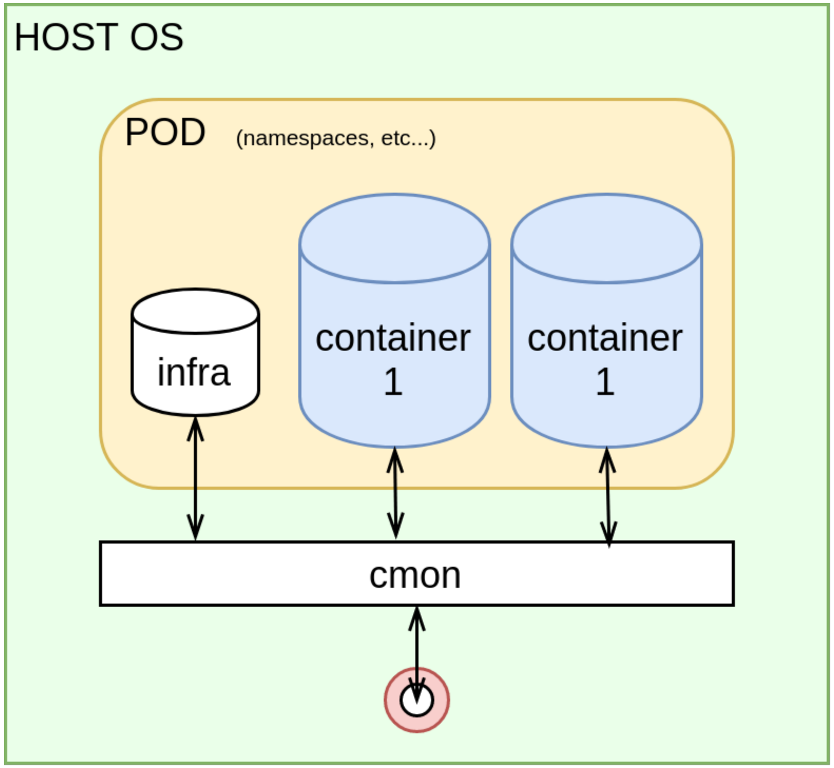
- Kubic Loadbalancer Node:
  - MicroOS without container runtime
  - haproxy installed
- Additional Kubic Node:
  - Additional Master for HA
  - Worker Node

Podman

- Container runtime for running OCI containers
- Same commands as docker
- Daemonless and rootless containers possible

- Container Manager as docker-compose
- Sharing of one network namespace
- Compatible with multiple image formats including the OCI and Docker image formats

Pods



- 1 Kubernetes pod in 1 Linux namespace and the same cgroup
- Flexible combinations of services possible (webserver, github pull, database, ...)

Daemonless

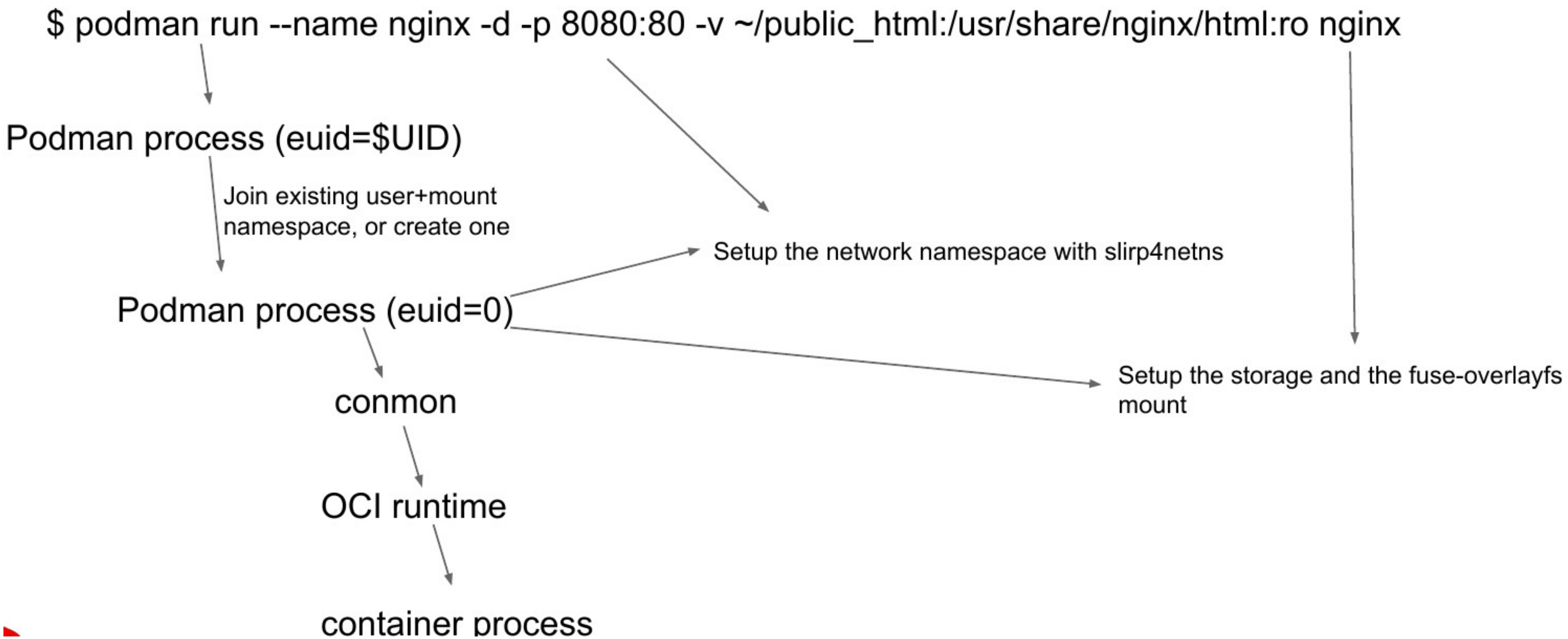
- Docker daemon is (mostly) executed by root
- Podman is working without central daemon
- Additional process *conmon* is monitoring and gives correct start parameters for the container runtime

Rootless

- Start of a container without root privileges
- Mapping of the UID in the namespace
- Using root in a container possible (isolating root)
- User in the container has default access on host system

- Docker offers that since version 19.03

Example of a rootless podman process



```
$ podman run --name nginx -d -p 8080:80 -v ~/public_html:/usr/share/nginx/html:ro nginx
```

Podman process (euid=$UID)

Join existing user+mount namespace, or create one

Podman process (euid=0)

Setup the network namespace with slirp4netns

Setup the storage and the fuse-overlayfs mount

conmon

OCI runtime

container process

Podman commands – as docker

- podman run
- podman exec
- podman info
- podman logs
- podman ps
- podman cp
- podman rm
- podman poll
- podman push
- podman build
- podman image
- podman images
- podman commit
- podman history
- podman stop
- podman start
- podman volume

Podman (only) commands

- podman generate kube
- podman container cleanup
- podman container exists
- podman container restore
- podman image exists
- podman pod create
- podman pod kill
- podman pod ps
- podman pod pause
- podman pod restart

“Do you wonna become a Contributor?”

Packaging

- Creation of packages with the Open Build Service
- Submit to openSUSE Factory
  - > openSUSE Tumbleweed

- https://build.opensuse.org/project/show/devel:kubic

Development of openSUSE Kubic

- Github contributions:
  - https://github.com/kubic-project

Quality Assurance

- Test it!
- Try it!
- Perform it!
- Report bugs!
- Bugzilla: https://bugzilla.opensuse.org/buglist.cgi?component=Kubic&product=openSUSE%20Tumbleweed

References

- openSUSE Kubic:

  https://kubic.opensuse.org
- https://www.projectatomic.io

- Podman:

  https://jaxenter.de/docker/podman-container-daemonless-rootless-89349
- Podman Usage:

  https://github.com/containers/libpod/blob/master/transfer.md

References

- openSUSE Kubic:

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- Podman:

  https://jaxenter.de/docker/podman-container-daemonless-rootless-89349

- Podman Usage:

  https://github.com/containers/libpod/blob/master/transfer.md

Questions?

openSUSE Summit 2020
Dublin
May 27 – 28, 2020

https://events.opensuse.org

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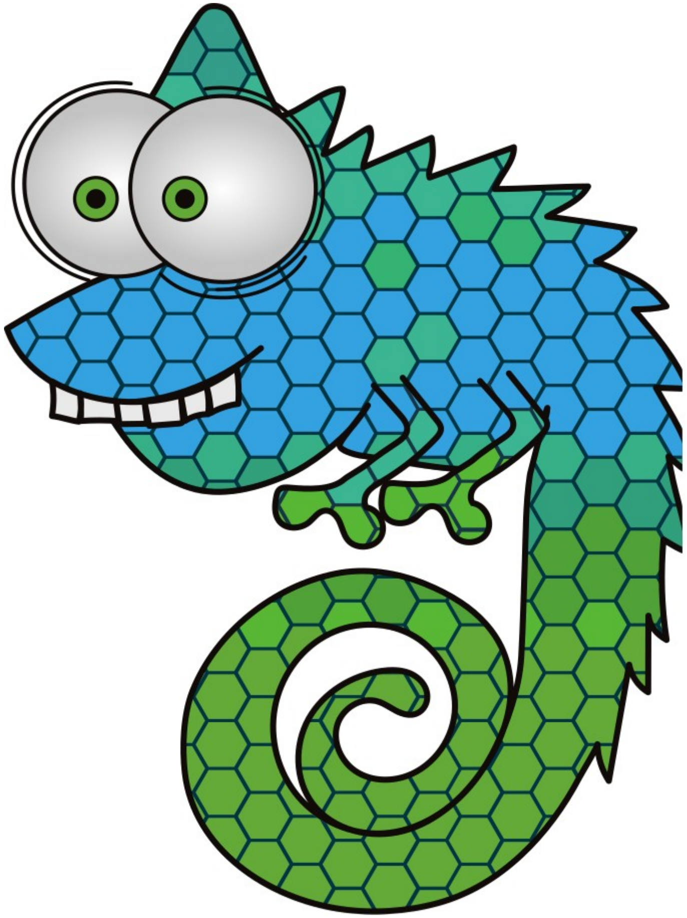
Thank you.



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